1   We claim:

1   1.   A method to provide information from a first information storage and

2   retrieval system to a second information storage and retrieval system, comprising the

3   steps of:

4   providing a first information storage and retrieval system, wherein said first

5   information storage and retrieval system comprises (N) PPRC adapters and information;

6   providing a second information storage and retrieval system, wherein said second

7   information storage and retrieval system is capable of receiving said information from

8   said first information storage and retrieval system via one or more of said (N) PPRC

9   adapters;

10   generating an Established Path Bitmap, wherein said Established Path Bitmap

11   recites said (N) PPRC adapters;

12   generating an Available Path Bitmap;

13   ascertaining, for each value of (j), if the (j)th PPRC adapter is in communication

14   with said second information storage and retrieval system, wherein (j) is greater than or

15   equal to 1 and less than or equal to (N);

16   operative if the (j)th PPRC adapter is in communication with said second

17   information storage and retrieval system, adding said (j)th adapter to said Available Path

18   Bitmap;

19   saving said Available Path Bitmap, wherein said Available Path Bitmap recites

20   (M) PPRC adapters, wherein each of said (M) PPRC adapters is in communication with

21 said second information storage and retrieval system, and wherein (M) is less than or

22 equal to (N).

1   2.   The method of claim 1, further comprising the steps of:

2   generating a PPRC task;

3   copying said Available Path Bitmap as a Working Bitmap;

4   selecting the (i)th adapter from said Working Bitmap, wherein (i) is greater than

5 or equal to 1 and less than or equal to (M), and wherein (i) is initially set to 1;

6   attempting to provide information to said second information storage and retrieval

7 system using said (i)th adapter.

1   3.   The method of claim 2, wherein said first information storage and retrieval

2 system is capable of communication with one or more host computers, further comprising

3 the steps of:

4   receiving said information by said first storage and retrieval system information

5 from said one or more host computers; and

6   generating a PPRC request comprising providing said information to said second

7 information storage and retrieval system.

1   4.   The method of claim 2, further comprising the steps of:

2   determining if said information was received by said second information storage

3 and retrieval system using said (i)th adapter;

4   operative if said information was not received by said second information storage

5 and retrieval system using said (i)th adapter, establishing if (i) equals (M);

6   operative if (i) does not equal (M):

7   incrementing (i);

8   repeating said selecting step, said attempting step, said determining step, and

9   optionally incrementing step.

1   5.   The method of claim 4, further comprising the steps of:

2   operative if said information was not received by said second information storage

3   and retrieval system using said (i)th adapter, updating said Working Bitmap to indicate

4   that said (i)th adapter is not in communication with said second information storage and

5   retrieval system.

1   6.   The method of claim 4, further comprising the steps of:

2   operative if said information was not provided to said second information storage

3   and retrieval system using any of said (M) adapters, copying said Established Path

4   Bitmap as said Working Bitmap.

1   7.   The method of claim 6, further comprising the steps of:

2   choosing the (k)th adapter from said Working Bitmap, wherein (k) is greater than

3   or equal to 1 and less than or equal to (N), and wherein (k) is initially set to 1;

4   sending said information to said second information storage and retrieval system

5   using said (k)th adapter.

1   8.   The method of claim 7, further comprising the steps of:

2   verifying that said information was received by said second information storage

3   and retrieval system using said (k)th adapter;

4   operative if said information was not received by said second information storage

5   and retrieval system using said (k)th adapter:

6   comparing (k) with (N);

7   operative if (k) does not equal (N):

8   increasing (k) by 1;

9   repeating said choosing step, said sending step, said verifying step, and optionally

10   said increasing step.

1   9.   The method of claim 7, further comprising the step of:

2   operative if said information was not received by said second information storage

3 and retrieval system by sending said information using said (k)th adapter, updating said

4 Working Bitmap to indicate that said (k)th adapter is not in communication with said

5 second information storage and retrieval system.

1   10.   The method of claim 9, further comprising the steps of:

2   operative if said information was not received by said second information storage

3 and retrieval system by sending said information using said (k)th adapter, and if (k)

4 equals (N), providing an error message.

1   11.   An article of manufacture comprising a computer useable medium having

2 computer readable program code disposed therein to provide information from a first

3 information storage and retrieval system to a second information storage and retrieval

4 system, wherein said first information storage and retrieval system comprises (N) PPRC

5 adapters and information, and wherein said second information storage and retrieval

6 system is capable of receiving said information from said first information storage and

7 retrieval system via one or more of said (N) PPRC adapters, the computer readable

8 program code comprising a series of computer readable program steps to effect:

9   retrieving an Established Path Bitmap, wherein said Established Path Bitmap

10   recites said (N) PPRC adapters;

11   generating an Available Path Bitmap;

12   ascertaining, for each value of (j), if the (j)th PPRC adapter is in communication

13   with said second information storage and retrieval system, wherein (j) is greater than or

14   equal to 1 and less than or equal to (N);

15   operative if the (j)th PPRC adapter is in communication with said second

16   information storage and retrieval system, adding said (j)th adapter to said Available Path

17   Bitmap;

18   saving said Available Path Bitmap, wherein said Available Path Bitmap recites

19   (M) PPRC adapters, wherein each of said (M) PPRC adapters is in communication with

20   said second information storage and retrieval system, and wherein (M) is less than or

21   equal to (N).

1   12.   The article of manufacture of claim 11, said computer readable program

2   code further comprising a series of computer readable program steps to effect:

3   generating a PPRC task;

4   copying said Available Path Bitmap as a Working Bitmap;

5   selecting the (i)th adapter from said Working Bitmap, wherein (i) is greater than

6   or equal to 1 and less than or equal to (M), and wherein (i) is initially set to 1;

7   attempting to provide said information to said second information storage and

8   retrieval system using said (i)th adapter.

1   13.   The article of manufacture of claim 12, wherein said article of

2   manufacture is capable of communication with one or more host computers, said

3   computer readable program code further comprising a series of computer readable

4   program steps to effect:

5   receiving said information by said article of manufacture from said one or more

6   host computers; and

7   generating a PPRC request comprising providing said information to said second

8   information storage and retrieval system.

1   14.   The article of manufacture of claim 12, said computer readable program

2   code further comprising a series of computer readable program steps to effect:

3   determining if said information was received by said second information storage

4   and retrieval system using said (i)th adapter;

5   operative if said information was not received by said second information storage

6   and retrieval system using said (i)th adapter, establishing if (i) equals (M);

7   operative if (i) does not equal (M):

8   incrementing (i);

9   repeating said selecting step, said attempting step, said determining step, and

10   optionally said incrementing step.

1   15.   The article of manufacture of claim 14, said computer readable program

2   code further comprising a series of computer readable program steps to effect:

3   operative if said information was not provided to said second information storage

4   and retrieval system using said (i)th adapter, updating said Working Bitmap to indicate

5 that said (i)th adapter is not in communication with said second information storage and

6 retrieval system.

1 16. The article of manufacture of claim 14, said computer readable program

2 code further comprising a series of computer readable program steps to effect:

3 operative if said information was not received by said second information storage

4 and retrieval system using any of said (M) adapters, copying said Established Path

5 Bitmap as said Working Bitmap.

1 17. The article of manufacture of claim 16, said computer readable program

2 code further comprising a series of computer readable program steps to effect:

3 choosing the (k)th adapter from said Working Bitmap, wherein (k) is greater than

4 or equal to 1 and less than or equal to (N), and wherein (k) is initially set to 1;

5 sending said information to said second information storage and retrieval system

6 using said (k)th adapter.

1 18. The article of manufacture of claim 17, said computer readable program

2 code further comprising a series of computer readable program steps to effect:

3 verifying that said information was received by said second information storage

4 and retrieval system using said (k)th adapter;

5 operative if said information was not received by said second information storage

6 and retrieval system using said (k)th adapter:

7 comparing (k) with (N);

8 operative if (k) does not equal (N):

9 increasing (k) by 1;

10   repeating said choosing step, said sending step, said verifying step, and optionally

11   said increasing step.

1   19.   The article of manufacture of claim 18, said computer readable program

2   code further comprising a series of computer readable program steps to effect:

3   operative if said information was not received by said second information storage

4   and retrieval system by sending said information using said (k)th adapter, updating said

5   Working Bitmap to indicate that said (k)th adapter is not in communication with said

6   second information storage and retrieval system.

1   20.   The article of manufacture of claim 18, said computer readable program

2   code further comprising a series of computer readable program steps to effect:

3   operative if said information was not received by said second information storage

4   and retrieval system by sending said information using said (k)th adapter, and if (k)

5   equals (N), providing an error message.

1   21.   A computer program product usable with a usable with a programmable

2   computer processor having computer readable program code embodied therein to provide

3   information from a first information storage and retrieval system to a second information

4   storage and retrieval system, wherein said first information storage and retrieval system

5   comprises (N) PPRC adapters and information, and wherein said second information

6   storage and retrieval system is capable of receiving said information from said first

7   information storage and retrieval system via one or more of said (N) PPRC adapters,

8   comprising:

9   computer readable program code which causes said programmable computer

10   processor to retrieve an Established Path Bitmap, wherein said Established Path Bitmap

11   recites said (N) PPRC adapters;

12   computer readable program code which causes said programmable computer

13   processor to generate an Available Path Bitmap;

14   computer readable program code which causes said programmable computer

15   processor to ascertain, for each value of (j), if the (j)th PPRC adapter is in communication

16   with said second information storage and retrieval system, wherein (j) is greater than or

17   equal to 1 and less than or equal to (N);

18   computer readable program code which, if the (j)th PPRC adapter is in

19   communication with said second information storage and retrieval system, causes said

20   programmable computer processor to add said (j)th adapter to said Available Path

21   Bitmap;

22   computer readable program code which causes said programmable computer

23   processor to save said Available Path Bitmap, wherein said Available Path Bitmap recites

24   (M) PPRC adapters, wherein each of said (M) PPRC adapters is in communication with

25   said second information storage and retrieval system, and wherein (M) is less than or

26   equal to (N).

1   22.   The computer program product of claim 21, further comprising:

2   computer readable program code which causes said programmable computer

3   processor to generate a PPRC task;

4   computer readable program code which causes said programmable computer

5   processor to copy said Available Path Bitmap as a Working Bitmap;

6   computer readable program code which causes said programmable computer

7   processor to select the (i)th adapter from said Working Bitmap, wherein (i) is greater than

8   or equal to 1 and less than or equal to (M), and wherein (i) is initially set to 1;

9   computer readable program code which causes said programmable computer

10   processor to attempt to provide information to said second information storage and

11   retrieval system using said (i)th adapter.

1   23.   The computer program product of claim 22, wherein said first information

2   storage and retrieval system is capable of communicating with a host computer, further

3   comprising:

4   computer readable program code which causes said programmable computer

5   processor to receive by said first information storage and retrieval system said

6   information from said one or more host computers; and

7   computer readable program code which causes said programmable computer

8   processor to generating a PPRC request comprising providing said information to said

9   second information storage and retrieval system.

1   24.   The computer program product of claim 22, further comprising:

2   computer readable program code which causes said programmable computer

3   processor to determine if said information was received by said second information

4   storage and retrieval system using said (i)th adapter;

5   computer readable program code which, if said information was not received by

6 said second information storage and retrieval system using said (i)th adapter, causes said

7 programmable computer processor to sequentially increment (i) and attempt providing

8 said information to said second information storage and retrieval system using, for each

9 incremental value of (i), the (i)th adapter until said information is received by said second

10 information storage and retrieval system or until (i) equals (M).

1   25. The computer program product of claim 24, further comprising computer

2 readable program code which, if said information was not provided to said second

3 information storage and retrieval system using the (i)th adapter, causes said

4 programmable computer processor to update said Working Bitmap, for each value of (i)

5 attempted, to indicate that said (i)th adapter is not in communication with said second

6 information storage and retrieval system.

1   26. The computer program product of claim 24, further comprising:

2   computer readable program code which, if said information was not provided to

3 said second information storage and retrieval system using any of said (M) adapters,

4 causes said programmable computer processor to copy said Established Path Bitmap as

5 said Working Bitmap.

1   27. The computer program product of claim 25, further comprising:

2   computer readable program code which causes said programmable computer

3 processor to choose the (k)th adapter from said Working Bitmap, wherein (k) is greater

4 than or equal to 1 and less than or equal to (N), and wherein (k) is initially set to 1;

5   computer readable program code which causes said programmable computer

6   processor to send said information to said second information storage and retrieval

7   system using said (k)th adapter.

1   28.   The computer program product of claim 6, further comprising:

2   computer readable program code which causes said programmable computer

3   processor to verify that said information was received by said second information storage

4   and retrieval system using said (k)th adapter;

5   computer readable program code which, if said information was not received by

6   said second information storage and retrieval system using said (k)th adapter, causes said

7   programmable computer processor to sequentially increment (k) and attempt sending said

8   information to said second information storage and retrieval system using, for each

9   incremental value of (k), the (k)th adapter until said information is received by said

10   second information storage and retrieval system or until (k) equals (N).

1   29.   The computer program product of claim 28, further comprising computer

2   readable program code which, if said information was not received by said second

3   information storage and retrieval system using the (k)th adapter, causes said

4   programmable computer processor to update said Working Bitmap, for each value of (k)

5   unsuccessfully used, to indicate that said (k)th adapter is not in communication with said

6   second information storage and retrieval system.

1   30.   The computer program product of claim 28, further comprising computer

2   readable program code which, if said information was not received by said second

3   information storage and retrieval system after sending said information using each of said

4   (N) adapters, causes said programmable computer processor to provide an error message.